

MANPOWER RESEARCH MONOGRAPH NO. 20

# Toward the Ideal Journeyman

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## Volume 1. AN OPTIMUM TRAINING SYSTEM IN APPRENTICEABLE OCCUPATIONS

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Manpower Administration



# Toward the Ideal Journeyman

## Volume 1. AN OPTIMUM TRAINING SYSTEM IN APPRENTICEABLE OCCUPATIONS

1970

U.S. DEPARTMENT OF LABOR J. D. Hodgson, Secretary

Manpower Administration





# FOREWORD

The importance of the subject of this monograph could not be more heavily underscored than it was in President Nixon's statement of March 17, 1970. He said: "Apprenticeship is one of the best systems for training craftsmen," who are a "highly regarded and prized national resource—one deserving of the highest respect."

Pointing out that "methods and the large number of preapprenticeship training opportunities make it possible to improve existing apprenticeship programs," the President called for intensive examination of the ways in which apprenticeship training—particularly in the construction trades—can be improved and expanded. That is the major objective of the report summarized here.

J. D. Hodgson  
Secretary of Labor



# PREFACE

This monograph is one in a series being published by the Manpower Administration of the U.S. Department of Labor. The study upon which it is based was part of a twofold research approach initiated in 1965 by the Office of Research and Development to acquire some insights into how craft training is accomplished and how it can be improved.

The first in a series based on the two-volume study of apprenticeship by Dr. Alfred S. Drew at Purdue University, this monograph presents the overall scope of the study, a brief description of the research tools, and the general findings and recommendations. Because it outlines an optimum system of training in apprenticeable trades—a system that would produce the “ideal journeyman,” skilled in today’s technology and adaptable to the technology of tomorrow—its thrust is general. It presents a model training system against which other programs can evaluate themselves.

In short, the report will be a handy tool for manpower training and development planners—government, labor, and industry. The Federal Committee on Apprenticeship recommended that it be distributed widely.

Subsequent volumes of this monograph will deal with the findings in specific trade areas surveyed—plumber-pipefitters in the building trades, machinists and tool and die makers, and selected printing crafts—and with a survey of the attitudes of high school students toward apprenticeship and the crafts. The full two-volume report, *Educational and Training Adjustments in Selected Apprenticeable Trades*, may be bought from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151, Accession Number (Volume I) PB-19054, (Volume II) PB-190996. A related report, titled “A Study of the Training of Tool and Die Makers,” by Morris A. Horowitz and Irwin L. Herrnsstadt, may be ordered by Accession Number PB-187558.

Uses of the apprenticeship study are readily apparent. Strengths and weaknesses in present apprenticeship programs can be more easily detected—in order to effectuate improvements—through comparison with a comprehensive, optimum model. Further, the report offers a framework on which to construct programs for apprenticeable occupations not



having a system for training. Also, parts of the study can be applied in improving various facets of vocational-technical education and of the transition between school and work.

PREFACE

The monograph is one in a series being published by the Department of Labor, Bureau of Vocational Education, as part of a two-volume study of the transition between school and work. The study was initiated in 1965 by the Office of Research and Development to acquire more accurate data on the transition between school and work and how it can be improved.

The first in a series based on the two-volume study of apprenticeship by the Bureau of Labor Statistics, the monograph presents the overall scope of the study, a brief description of the research tasks, and the general findings and recommendations. Because it outlines an approach to the study in apprenticeship training, a review that would produce the "ideal framework," needed in today's technology and adaptable to the technology of tomorrow—in short a general, it provides a model training system against which other programs can evaluate themselves.

In short, the report will be a handy tool for manpower training and development planners—government, labor, and industry. The Federal Committee on Apprenticeship recommended that it be distributed widely.

Subsequent volumes of this monograph will deal with the findings in specific areas surveyed—apprenticeship in the building trades, health care, and food and the metals and related printing crafts—and with a survey of the attitudes of high school students toward apprenticeship and the field. The full one-volume report, Educational and Training Requirements for Federal Scientific and Technical Personnel, was published in February 1966. A related report titled "A Study of the Training of Food and the Metals," by Morris A. Harwood and Lewis A. Harwood, may be ordered by document number PB-187554.

One of the apprenticeship study is to provide significant findings and recommendations in various apprenticeship programs can be more easily derived from a review of apprenticeship programs—through comparison with apprenticeship programs in other countries, the report offers a framework on which to construct programs for apprenticeship training.



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# INTRODUCTION

This volume, based on a study of apprenticeship by Purdue University, outlines an optimum training system in apprenticeable trades—one that may be used as a model and guide.

The researchers, attempting to be as comprehensive as possible, studied such subjects as program administration, policymaking, selection and recruitment, and the training process itself. Also investigated were such matters as philosophy and objectives, continuation training for journeymen, methods of adjustment to technological change, the training plant, adequacy of instructors, and the terms of the apprentice agreement.

Surveys and interviews were the major sources of information. Data were obtained from apprentices, journeymen, instructors, employers, union officials, teacher-educators, counselors, training coordinators, and high school students, and from representatives of employer groups, accrediting agencies, and joint apprenticeship committees. Analysis of trade journals and on-the-spot examinations of outstanding training programs supplemented the fact gathering process. The Federal Committee on Apprenticeship and advisory committees for each trade contributed heavily to the study.

A rating form was developed to ascertain the degree of consensus among those surveyed as to the characteristics that go to make the “ideal journeyman” and thus help define the end product of an optimum training system for apprenticeable skilled trades.

Questionnaires sent to apprentices were intended to furnish material useful in framing proposals on recruitment and retention as well as to suggest areas in which instruction could be improved. Similarly, journeymen were queried concerning their backgrounds and current trade training, their preferences for further training, and their rating of their apprenticeship experience. The main interest here was in determining the extent to which postapprentice training is available and the amount of interest tradesmen have in keeping up with technological developments.

A questionnaire also was directed to companies that produce equipment, parts, materials, and tools used by skilled workers. This questionnaire was designed to ascertain methods used to disseminate information



on technological changes and related operational requirements as well as to perceive emerging and anticipated changes. The producers also were asked to assess the degree of acceptance or resistance to technological changes.

A preliminary structure for an optimum training program was built by the researchers through a review of accrediting criteria of 30 regional apprenticeship agencies and professional associations, 19 national apprenticeship and training standards on file with the Department of Labor's Bureau of Apprenticeship and Training, and lists of "essential elements" compiled by advisory committees to the research group. Through modification and refinements suggested by research in other areas, the preliminary structure finally yielded the optimum framework for training and development in apprenticeable trades. This framework was then given substance through field studies of outstanding apprenticeship programs. The appendix to this monograph distills this information into a checklist to aid in evaluating current training systems or setting up new ones.

To facilitate recruitment of youth into apprenticeable occupations by gaining insight into their attitudes and plans regarding careers in the skilled trades, a questionnaire was distributed to male high school students in Indiana. The results of this inquiry, plus information compiled on the counseling programs of numerous high schools, should be helpful in shaping more effective vocational guidance and recruitment programs underscoring career opportunities in apprenticeable occupations.

# THE OPTIMUM PROGRAM

The researchers concluded that what is needed is a comprehensive model for training in apprenticeable trades. This model could be commonly accepted as being the best and most desirable manner of training apprentices as well as helping to supply the skilled manpower needs of the Nation.

## *Training System*

The model is comprehensive in that it encompasses such important program areas as administration and finance, as well as course content and teaching techniques. It recognizes primarily that direction and organization are needed in manpower training, be it through apprenticeship or other means. Program must be totally organized from beginning to end, to prepare apprentices not only to develop their own capabilities, but also to meet the ever changing requirements of our economy. Without organization, it is easy for vital elements of a program to be neglected or overlooked. These elements, such as built-in techniques for detecting and adjusting to technological change or methods of encouraging and enabling journeymen to continue their training following apprenticeship, are an integral part of an optimum training system. They are too often neglected, according to the report.

But with solid direction from participating employers and unions, joint apprenticeship committees, and the government, with those responsible at every level clearly understanding their roles and duties, evaluation of the elements that make an optimum program will be continual and a service will be rendered in meeting the country's manpower needs.

The objectives of a complete training system require common understanding and acceptance. One way of focusing on this is to ask: What does the program envision as the "ideal journeyman"? Despite the trend toward specialization and mechanization in the American economy, most of those surveyed for this study believed that the objective of apprenticeship should be development of well rounded journeymen rather than specialists. The respondents felt that the foremost trait a journey-

man should have is overall skill. After this, the traits most desired were the ability to produce high quality work, initiative in moving from one task to another with little supervision and no delay, and ingenuity to see a job through even under difficult circumstances.

The philosophical beliefs and general objectives underlying apprenticeship should be developed jointly by all concerned groups and be available in explicit written statements. These statements of objectives should be distributed widely by the Department of Labor and other official agencies to apprentices, journeymen, employers, unions, high school students, vocational instructors, and counselors.

Setting the objectives of a program presupposes the existence of a policymaking body; every apprenticeship program needs such a body to provide firm direction. Most often, these policymaking bodies take the form of joint apprenticeship committees comprised of labor and management representatives. But outstanding programs also are run unilaterally by management or labor. Whatever the type of the program, there must be a body that is clearly responsible for directing the program, allocating responsibility, and formulating and publishing both general and specific statements of program objectives. Where applicable, this body also should coordinate the training program with guidelines developed by national apprenticeship groups, either Government or private.

While the foregoing might be regarded as a statement of the obvious, it was found that many apprenticeship programs were not administered effectively. Responsibilities were not clearly delineated. Persons in key administrative positions often lacked training in administration, coordination, and communications; they did not fully understand the scope of their duties and many lacked current, written descriptions of their functions and responsibilities. Apprentices were sometimes confused as to who was directly responsible for their training during a particular phase.

Sponsors of even those programs identified as "outstanding" by persons in the industry recognized that improvements could be made in administration. Perhaps this recognition is a requisite to forward looking action.

The optimum program should have an executive responsible for coordinating the various segments of the staff. His job is to integrate instruction, supervision, communications, and counseling and to carry out the policies set by the joint apprenticeship committee or other policymaking body.

Under him should be a professional staff adequate to the program. Lines of authority and areas of exclusive responsibility should be set out



initially so that each one is clear as to his function in the program. This means written job descriptions, staff training through attendance at professional workshops and the like, complete recordkeeping and reporting systems, and workflow charting.

## *Recruitment*

A successful training program in any trade calls for a sufficient pool of interested applicants from which to select apprentices. Recruitment has been made more difficult by the sometimes unfavorable image of craftsmen and by misinformation on which the image is built. Most of the high school students surveyed underestimated the pay of apprentices and journeymen. The black youth among them generally believed they could not get into apprenticeship at all.

Consequently, a priority project of any apprentice program—along with nondiscriminatory recruitment and selection—should be development of public relations that make the trade more attractive to young persons by pointing up the opportunities that do exist. Ideally, there should be a national program. Regional efforts such as trade contests and career days in high schools should be utilized as well. High school counselors should be well supplied with information on particular trade programs to help youth leaning toward a craft career.\* Interestingly, high school students' choice of career was found to be significantly influenced by a favorable parental attitude—particularly the mother's attitude.

While high school students tended to underestimate the pay of apprentices and journeymen, those apprentices and journeymen surveyed considered that pay and benefits during the training period were not adequate. Perhaps such complaints would be inevitable under any circumstances, but they do underscore the important fact that if trade training is to be competitive with other jobs or career opportunities open to young persons, the pay of apprentices must be roughly in line with that of other types of endeavor. The long term prospect is seldom a strong influence on the youth just starting out; the fairly immediate outlook is predominant in most cases, particularly for the youth with family responsibilities.

In sum, then, all organizations involved in apprenticeship, starting with the Department of Labor, should develop and disseminate informa-

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\* A limiting factor is that only half of U.S. high schools provide any sort of vocational guidance. *Vocational Education: The Bridge Between Man and His Work*, General Report of the Advisory Council on Vocational Education, Washington: Office of Education, U.S. Department of Health, Education, and Welfare, 1968, p. 8.

tion about recruitment, selection, and the work and earnings of craft journeymen so that the best candidates—regardless of race, sex, creed, color, national origin, or economic status—will be attracted to apprenticeship. In addition, the pay and benefits of apprentices should be updated periodically, either through the collective bargaining agreement or by other means open to the program's administrator, to make sure that recruitment and retention of apprentices are not hindered by lack of realistic compensation. Grants, scholarships, subsidies, and other aids to trainees should be available and publicized in order to supplement this effort.

Selection standards, a subject of controversy for a number of years, are crucial in insuring that the flow of recruits into apprenticeship reflects a broad spectrum of talents and backgrounds. The relevance and validity of apprentice entry tests to the actual training or work has been criticized; many of the persons surveyed thought that there was plenty of room for improvement.

An observer comparing selection standards at the beginning of the 1960's with those of today could hardly avoid the conclusion that change has been marked. Affirmative recruiting action and special preparatory training to qualify disadvantaged youth to enter apprenticeable trades have had an impact in reducing the rigidity of selection standards.

The urgent need still remains, however, for apprenticeship administrators to review continually their selection standards with the intention of broadening the base for choosing candidates and validating current standards and admission procedures in light of their practical relevance. Journeymen themselves suggested that the attitude and motivation of candidates for apprenticeship be weighed in selection.

The optimum program should devise careful procedures for appraising experience and education so that advanced standing and pay are given to those whose backgrounds warrant it. The optimum program should review periodically its standards and practices to test their validity in light of the current need for skilled journeymen. It should use flexible criteria in selecting candidates to take account of individual differences and to accommodate such emerging concepts as multipurpose programs and individual progress.

### *Instructor*

In all the crafts studied, most of the on-the-job and related classroom instruction was carried out by journeymen. While the journeymen were

regarded as competent in their craft, they had seldom had any training as teachers. This was particularly true of those engaged in on-the-job instruction, where certification is rarely required. In one trade, 77 percent of journeyman instructors who responded to the survey reported they had received no training as instructors. An added problem of instructor selection is that many journeymen, although they may be expert craftsmen, have no wish to teach.

An optimum program should establish procedures to recruit and assign journeymen who really want to teach their trade and are fully qualified to do so. It should establish incentives to draw potential teachers into well equipped training programs and to continue learning thereafter.

Not only will such instructors be more effective, they also will have greater familiarity with technology which has not yet been fully adopted by the entire trade. These instructors should be rewarded by higher pay and certification, if feasible.

### *Course Content*

In most training programs, "occupational analysis" is used to determine course content and the order in which topics are presented. Use of this method implies recognition that the sequence in which a task is done in actual production is not necessarily the best way to learn it.

But while occupational analysis was used to a degree in most apprentice programs, there was evidence that the studies on which it was based were outdated. To be effective, occupational analysis must be based on what workmen in the trade are currently doing. When framing the instruction content, provision also must be made for anticipated technological changes. Use of the "work diary"—detailed records by craftsmen of their daily activities—might be a good method of checking the currency of course content.

Once the common operations in a trade are identified, a course can be blocked out in a "curriculum planning guide" or other instrument to control the presentation in the classroom and on the job. For example, four major blocks were identified in the pipe trades: preparing materials, joining materials, installing materials and equipment, and inspecting and testing. These blocks were broken down into "operational units," such as cutting-beveling, and then into specific activities, such as "using a tap to thread a brass flange." While many different activities from the



several major blocks might be required in one production procedure, they are grouped for purposes of effective and nonduplicating instruction.

To recapitulate, training content must be based on continuing analysis of each occupation, with provision for forecasting changes affecting the work of the trade. Intertrade cooperation to keep course content updated should be instituted. Many activities and operations are common to most trades; this makes feasible joint approaches on instructional materials and techniques.

The trend toward standardization of teaching materials—both technical and general—should be part of an optimum training program. A prerequisite to standardization is a common training language for a particular trade. Problems now arise not only from regional variances in certain technical terms but also from vaguely defined words and phrases of a general nature that carry different meanings for different people, for example, “supervision,” “curriculum,” and “coordination.”

A standard glossary of words, titles, and phrases must be developed for universal use within a trade. It should be developed cooperatively by labor and management.

The development of nationally standardized training materials require for their adoption substantial physical facilities and adequate staffing. Once developed, the material must be available in sufficient quantity to supply all training programs. It must be updated periodically in response to an industry’s changing needs.

### *On-the-Job Training*

There was general agreement that the major drawback of on-the-job training is the difficulty of attaining well rounded experience because of infrequent job rotation or the bending of training schedules to serve production needs. In one trade, four of 10 apprentices reported that they were hardly ever or never deliberately rotated, with the result that they did not have a sufficient variety of work assignments. Another frequent complaint was that journeymen were so caught up in production demands that they had little time to devote to apprentices.

These defects stem largely from administrative neglect, according to the study. Clear policies of adequate job rotation of the apprentice must be backed up by fixed responsibilities and close supervision of on-the-job training. Firm direction in this respect must flow from the joint appren-

ticeship committees or other policymaking bodies, with provision to see that policy is carried out. Placing an apprentice on a job, unaided and unsupervised, does not add up to meaningful training.

In addition, the administrative body responsible for a training program should select training sites which provide the range of equipment and production tasks necessary to accommodate on-the-job training needs.

The optimum program should incorporate careful planning to avoid undue stress on production to the detriment of apprentice training. It should strive for progressively greater challenges to the apprentice at each level of work experience, close correspondence between the production work and the classroom training, and more effective means of determining the skill level an apprentice attains on the job. The optimum program should give the journeyman instructors on the job sufficient time and resources to do the job correctly and thoroughly. This requires maximum integration of training and production goals.

In sum, the well run training program provides for adequate rotation; experience with the latest equipment, materials, processes, and a variety of tasks; adequate training time within the framework of production needs; progressively greater challenges to apprentices at each level of work experience; and effective means of testing and recording achievements of skills taught on the job.

Incorporation of these elements will augment the inherent advantages of on-the-job training—the pride a skilled craftsman can instill in the apprentice, the opportunity both to earn and to learn, the economic utility of the work processes taught, and the general adequacy of equipment in American industry.

### *Related Instruction*

While classroom instruction generally was regarded as good by apprentices, a major complaint was the lack of correlation in timing and content between theory and practice, that is, between what is taught in the classroom and what is learned on the job. In many cases, theory was taught well before or well after the matching skill was performed on the job. The optimum program should devise scheduling which assures that theory in the classroom is taught just prior to or concurrently with the need to apply it in the actual work process. It also will make room for the teaching of nontechnical subjects. Specific needs the study mentioned are leadership development, public relations, and work planning and or-

ganization. Courses on these subjects increase a trainee's value to his employer and enhance his competence as a tradesman.

Other common complaints were that the scope of related instruction exceeded the breadth of training on the job or, conversely, excluded a substantial amount of theory underlying actual trade activity.

New methods, materials, processes, and equipment must be introduced into the training program as early as practicable. Similarly, instructional materials should be modern and employ such teaching aids as films, computerized instruction, and programmed learning. The use of trade literature as an adjunct to classroom instruction should be expanded; reading such literature might become a habit carried over to journeyman life.

Along with the emphasis on the new, the oldest method of effective learning—direct and close contact between teacher and pupil—should not be forgotten. Class sizes should be kept manageable.

Achievement tests need to be updated and applied at various stages in the instruction. This goes hand in hand with improved methods of granting and recording credit for advanced standing, as mentioned earlier.

In short, related instruction requires as much formalization as the size and resources of a program will permit. The assistance of a variety of agencies, particularly public schools, should be elicited in obtaining the best possible facilities.

As stressed previously, journeymen who teach should have teacher training. A fair-share formula should be developed for reimbursing apprentices for out-of-pocket costs of related instruction—transportation, books, tuition, and the like. A leading gripe of apprentices was that they “have to attend on own time.”

### *Continuation Training*

In satisfying industry's need for journeymen of overall skill, high work standards, initiative, and ingenuity, a training system will meet to a great extent the challenge posed by developing technology. But this is not all that must be done. Before the path to the “ideal journeyman” is discussed in greater detail, let us consider the worker with adequate training as he finishes his apprenticeship program. Entering his field as a journeyman in the 1970's, he will be equipped for a time for all that comes his way. Yet time passes and new methods arrive. How does he keep up?



This question is too often overlooked in many of today's trades. An optimum training program should include continuing journeyman training to acquaint the worker with recent developments and give him the opportunity to remain currently informed.

Lack of postapprentice training on any consistent basis is a significant problem. This is indicated by the responses of journeymen in one trade in the survey: One-third reported that they had not attended a trade related training course in the past 10 years; a larger proportion stated that they had taken no trade course lasting 10 hours. In another trade, fewer than 30 percent of responding journeymen had participated in any organized training in the 2 years preceding the study.

These figures cannot be ascribed to lack of motivation on the part of journeymen. Survey responses indicated that most journeymen recognize the need for continuation training related to their trade and are willing to contribute time and to share the cost, if necessary, to keep up to date.

One concern commonly expressed by journeymen was that postapprentice programs be formalized so as to give credit for advanced achievement. In this regard, they recognized that better records must be kept and requested assurance that advanced training be relevant to their work.

Presently, journeymen receive their knowledge of new technology through a number of avenues, including union reports, attendance at vocational schools, manufacturers' service bulletins, trade journals, and talks with their fellow workers, foremen, supervisors, company engineers, inspectors, manufacturing agents, and others. Listed as the most frequent and valued means of keeping current were trade journals, discussions with fellow workers, and manufacturers' service bulletins. But these efforts were mostly hit-or-miss; there were few systematic programs to keep journeymen abreast.

Both journeymen and apprentices expressed a desire for more opportunities to gain firsthand experience and knowledge of new equipment and processes; however, access to the latest equipment was in most cases limited. Also, the journeymen emphasized the shortcomings of trade journals and other literature. Since many tradesmen thought they could make a contribution to the trade journals, perhaps articles could be solicited from those actually working with new technology to acquaint others with directions their own work might be taking in the future.

The researchers recommended that teams of journeymen, employers, technical representatives, and others who might be concerned be appointed to determine the content and structure of continuation training.

The teams should develop and implement plans that will stimulate journeyman participation. Such programs must provide for good record-keeping to facilitate the granting of credit—particularly where licensing or certification might be appropriate. They should feature easy availability, low cost (if any) to the worker, increased pay, and upgrading to higher positions.

### *Apprentice Agreement*

More so than in earlier years, trade apprentices comprise a diverse group. Ages of apprentices surveyed ran from 18 to more than 40, and their backgrounds were varied. But apprentices usually were married and had at least high school diplomas. A universal trait was their acceptance of apprenticeship as a desirable avenue to lasting career opportunities—plus the desire, common these days, for a voice in shaping their training. Being aware of the dangers of skill obsolescence in a constantly changing world, they also accepted the desirability of continuing education and training upon completion of their apprenticeships.

As emphasized previously, the duration of apprenticeship should take into account the past training and experience of the apprentice, so that the most efficient use may be made of the trainee and the resources of the program. The goal should be the training of a well rounded journeyman with maximum efficiency and dispatch. The trade continually must be aware of the nature of its trainees, in order to spot trends which may call for adjustments in the apprenticeship program. As recruitment sources are broadened, the backgrounds of trainees change.

While apprentices are generally given copies of their apprentice agreements, they frequently do not understand them. The agreements should clearly set forth the period of indenture, conditions of employment, requirements for related instruction, a schedule of work processes, and the responsibilities of all parties under the agreement.

### *Environment*

An adequate physical plant is a requisite to a good training program, as are up-to-date equipment in sufficient quantity, modern teaching tools, and well trained personnel. A reference standard should be developed as a basis for judging a program on these points.

While apprentices and journeymen generally gave training programs

high marks, a frequently expressed concern was the limited opportunity to become acquainted with the latest techniques and equipment. Where possible, pooling arrangements should be developed to rotate apprentices to locations where the latest equipment is in use. Also, greater use should be made of field trips to familiarize personnel with innovations and alternative methods.

### *Recordkeeping and Licensing*

The researchers found that recordkeeping in general was deficient. Training records were most nearly adequate in the area of related training, sketchy for on-the-job training, and virtually nonexistent for any form of journeyman training. A standard form to maintain training records is essential, so that uniform methods of according and transferring credit can be worked out. Complete records are important for evaluating instructors, documenting the progress of apprentices, and "fine tuning" apprentice programs through followup studies on their graduates.

The necessity of maintaining full training records is also related to licensing and certification. Many types of licenses and certificates are held by journeymen within a given trade; they are prized credentials. Journeymen want their relevant training and experience to be applied to licensing and certification. They also want training programs to include information and experience needed for licensing and certification. Records thus become vital.

### *Financing Apprenticeship Programs*

There is no clearly identifiable best way of financing. Whether a program is financed through a collective bargaining agreement, subsidized jointly by labor and management or by one party, or supported essentially by public funds, what is necessary to success is adequate and continuous financing. Budget planning is a must; all parties to a program must be willing to contribute a fair share, based on complete understanding of the costs as well as the benefits of trade training.





# CHANGING TECHNOLOGY

The researchers found no comprehensive system within trade training programs for alerting and preparing apprentices, journeymen, and instructors to adjust to new equipment, processes, and other changes affecting job requirements. In other words, the programs had no mechanisms for responding automatically to these changes; such mechanisms are essential elements in a training system of maximum effectiveness. Although there were fragmented attempts to keep subject matter up to date and to forecast changes, skill obsolescence was an important problem recognized by apprentices and journeymen as well as by training personnel.

The report recommends that the trades develop a coordinated approach for identifying new developments and forecasting changes requiring modifications of trade training programs. The joint approach should include keeping abreast of developments to determine the impact that social, economic, and political changes—as well as technological shifts—might have on trade training.

Similarly, a program requires constant evaluation and review for better ways of doing a job. Various trades should cooperate in these approaches, since technological advances quite often occur along broad fronts, touching many occupations, and must be met with extensive preparation.

As already mentioned, trade journals have a role to play in communicating changes; certainly, such trade literature should be distributed as widely as possible. More use should be made of manufacturers' service bulletins; in fact, the technical expertise which exists in companies producing new types of equipment and materials must not be overlooked as an instructional source. Manufacturers say they are ready and willing to supply materials and personnel for training; this source of instruction appears particularly applicable to the continuing education of apprenticeship instructors. The survey showed that supplying companies do furnish training materials for apprenticeship programs and some also provide instructors, tools, equipment, samples, and scrap parts. Virtually all of them release new product information through trade magazines and other sources. Followup efforts to develop a market for the new products

generally include publishing instruction manuals, calling in sales and service personnel for special training, conducting training programs for key distributor-sales people and major users, and arranging training for dealers' service personnel. However, few firms listed a training program for journeymen as a direct and primary step in helping installers develop the skills needed to handle new products.

Once changes in technology are identified as requiring modifications in training programs, the adjustments should be made as swiftly as possible. In such a manner all may benefit: management, labor, training participants, government, and consumers. Since all stand to gain, an optimum program should distribute among the beneficiaries the costs necessary to build into the program the formalized mechanisms for adjusting to technological changes. For example, collective bargaining agreements might include incentive provisions for updating skills.



## SPECIAL APPROACHES

Special training approaches applied by the trades studied may recommend themselves to other occupations—both those that have little organized instruction and those that wish to augment existing programs. For instance, individualized instruction techniques were well received in some trades, particularly where related instruction classes were not available. Correspondence courses and other home study techniques are especially recommended if there is no teacher.

Trade contests and other forms of competition sponsored by unions, trade associations, or jointly by both, have proved beneficial. They should be promoted to develop the pride of apprentices and journeymen in their skill, to raise morale, and to accord recognition to outstanding talent.

Innovations that appear applicable in a number of training situations include the International Training Fund, established by the pipe trades to extend and improve apprentice and journeyman training, and the Fund's annual training program for instructors and other trade training personnel at a university.

Certain training programs for tool and die makers provide for particularly close instructor-trainee relationships in the first year of apprenticeship by the use of a "coach" for each 15 or fewer apprentices. This person counsels each of his apprentices. He schedules and checks their progression in shop assignments. During the first 12 weeks, the coach instructs his apprentices full time in school; during the next 40 weeks he works with them on the job, cooperating closely with the foreman and giving related instruction.

Other departures in the machinists trade include the "rotational system" of scheduling—alternate periods of full-time training on the job and full-time training in school—and the "multipurpose approach," wherein a common core of training is followed by instruction in occupations in which the trainee wishes to specialize.

Special advances in the printing trades include a national training center run by the International Typographical Union which has introduced a "credit system" of training, in which rigid time requirements for

an apprentice training cycle are replaced by required and elective work classifications.

Government agencies, trade organizations, and others concerned with training all should assist in the dissemination of information on new techniques with wide applicability and should lend a hand to training programs desirous of adopting exemplary innovative features.

# APPENDIX

## SOME ESSENTIALS OF AN OPTIMUM TRAINING SYSTEM IN APPRENTICEABLE OCCUPATIONS

### *Training System*

- There is a policymaking body and it has responsibility for program development.
- Program objectives are written, distributed, and continuously evaluated.
- Training objectives are based on the skills, knowledge, and attitudes needed by journeymen in the trade; results are measured against these benchmarks.
- Administrative head is appointed by policymaking body and is responsible for implementation of its policy directives.
- Lines of authority and responsibility are clear and everyone in the administration knows how he fits in.
- Jobs in administration have descriptions and titles which match the job.
- Communication channels are established and maintained.
- Budget is adequate to provide continuity of training.
- Legal and authorized budgeting and accounting procedures are used.

### *Recruitment and Selection*

- Training glossary is developed and disseminated.
- Trainees are recruited from all possible sources.
- Recruitment and selection procedures are established on a sound legal base and are made known to the public.



- Policy for granting advanced standing to entering trainees with applicable education or experience exists and is universally applied.
- Schools and other sources of trainees are provided up-to-date information on training and career opportunities in the trade.
- Recruitment and selection practices are studied and dropouts followed up in order to analyze retention rates.

### *Training Process*

- Apprentices, journeymen, instructors, and related training personnel participate in executing a fully planned and developed curriculum.
- Trade analysis techniques are used to identify course content, whether for a national, regional, or single-employer curriculum.
- Presentation of subject matter is in best manner to assure learning and provide for successive levels of achievement.
- Administrative officer controls curriculum through planning guide, and keeps record of what, when, where, and to whom content will be or was taught.
- National training materials are developed that can be modified according to local needs.
- Training materials for the instructor are also developed.
- Instructional material includes nontechnical subject matter, such as work planning, as well as technical subject matter.
- In on-the-job training, adequate job rotation is provided through jobs that provide a challenge.
- On-the-job training is correlated with related instruction.
- On-the-job training jobsites are suitable for training; production demands are not too heavy for training purposes and there is an adequate ratio of journeymen to apprentices to assure proper attention to training.
- Provision is made for determining achievement levels of trainees in on-the-job training.

- In related instruction, physical facilities are adequate and class sizes manageable.
- A plan for determining postapprentice training needs and desires for journeymen is utilized.
- Continuation training is jointly planned and sponsored, with a view toward assuring continued job proficiency and adjustment to technological change.
- Journeyman training costs are shared by the employer.
- Records and credit for advanced training are provided.
- Timing of theory and skill training is coordinated in instruction.
- Trade materials and publications in adequate quantity are used as adjuncts to classroom training.
- Classroom credit is adequately appraised and recorded.
- If special courses are needed for groups or individuals, they are provided.
- Manufacturers' resources are used in training, i.e., their schools, trade literature, representatives, and the like.
- A competitive atmosphere is sought in training.
- Opportunity to contribute to trade literature is provided.
- Problem-solving activities are designed to develop ingenuity, leadership, and initiative.
- Field trips are used to acquaint trainees with new methods and modern facilities.
- Modern teaching tools and techniques are used in all phases of instruction.
- Performance standards realistically reflect industrial practice.
- Trainee is monitored by single individual throughout all phases of training, and adequate record of his progress and achievement is kept.
- Method and frequency of evaluation should meet with trainee's satisfaction.
- Teaching is geared to the interests and abilities of the trainees.

- Provision is made for adequate counseling.
- Instructors are selected on basis of trade competence and teaching ability.
- Instructor recruitment is aided by adequate recognition through economic reward and through licensing and/or certification.
- Training for instructors occurs both prior to and during teaching.
- Provision is made for periodic review of program content with view toward updating.
- Provision is made for forecasting technological changes and the demands they will place on the training program.

### *Apprentice Agreement*

- Apprentice agreements are written and available to all parties, and special effort is made to make sure the apprentice understands his.
- Period of apprentice agreement is specified, whether in terms of time or competency evaluation.
- Apprentice agreement is comprehensive, covering terms and conditions of employment, requirements for related instruction, schedules of work processes, and responsibilities of all parties under it.

### *Facilities*

- School and industry mix of facilities and equipment is adequate for training.
- Training stations are accessible to trainees.
- Space and facilities are adequate to provide for planning and implementing instruction utilizing modern techniques and technology.
- Safety is stressed and periodic inspections are made for hazardous conditions at training sites.



## *Public Relations*

- A joint public relations program continuously presents a positive image of trade training.
- Trade contests, formal events, and awards help tell the apprenticeship program's story to the public.
- Liaison is kept and cooperation sought among labor, industry, government, and educators in advancing the common goals of trade training.

## *Research*

- A research and development program provides the key to appraising the entire system on a continuing basis.
- Major economic, social, political, and technological forces are watched to determine their impact on trade practices and training.

(CUT ALONG DOTTED LINE)

Contact your regional BAT office for further information and assistance on the material covered here.

## REGIONAL OFFICES

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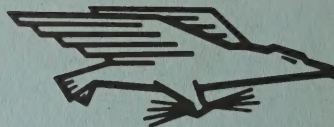
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